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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,291	11/13/2003	Satoko Shitagaki	12732-174001 / US6725	5773
26171	7590	12/20/2005	EXAMINER	
FISH & RICHARDSON P.C. P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			YAMNITZKY, MARIE ROSE	
			ART UNIT	PAPER NUMBER
			1774	
DATE MAILED: 12/20/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/706,291

Applicant(s)

SHITAGAKI ET AL.

Examiner

Marie R. Yamnitzky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11/13/03, 06/30/05 and various IDS's.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 15-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date rec'd 13 Nov 2003, 09 Jan 2004, 27 Feb 2004 and 23 Aug 2005
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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1. The preliminary amendment filed June 30, 2005, which amends claims 20, 22, 24, 26 and 28 has been entered.

Claims 15-29 are pending.

2. Claims 19 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 19 and 28 are incomplete because R7 and R8 of general formula 5 are not defined. (For purposes of comparing to the prior art, the examiner will presume that "R1 to R6" should read --R1 to R8-- in claim 19. This presumption is consistent with page 6 of the specification.)

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 15 and 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 9-188874.

JP '874 was cited by applicant. A machine-assisted translation of JP '874 is provided with this action. A three page printout for Accession Number 1997:491099 HCAPLUS, which shows the formulae of a few of the compounds disclosed in JP '874, is also provided with this action.

The prior art discloses specific examples of quinoxaline derivatives represented by present formulae 1, 3, 4 and 5, and teaches that the quinoxaline derivatives may be utilized in the light-emitting layer of an electroluminescent device. For example, see claims 1, 6, 9 and 11, paragraphs [0044]-[0045], compounds III-56 through III-58, III-159 through III-161 and III-262 through III-264, and paragraphs [0139]-[0152].

Compounds III-56, III-159 and III-262 are examples of prior art compounds represented by present formulae 3 and 4.

Compounds III-57, III-160 and III-263 are examples of prior art compounds represented by present formula 1.

Compounds III-58, III-161 and III-264 are examples of prior art compounds represented by present formula 5.

Portions of the text of the tables defining these compounds were not translated by the machine-assisted translation. The examiner obtained an oral translation from a translator in the USPTO Translation Branch and was informed that the Japanese language text for III-56, III-159 and III-262 describes the formation of a benzene ring by  $R_{17}$  and  $R_{18}$ , and by  $R_{27}$  and  $R_{28}$ . The Japanese language text for III-57, III-160 and III-263 describes the formation of a benzene ring by  $R_{16}$  and  $R_{17}$ , and by  $R_{26}$  and  $R_{27}$ . The Japanese language text for III-58, III-161 and III-264

describes the formation of a benzene ring by R<sub>15</sub> and R<sub>16</sub>, by R<sub>17</sub> and R<sub>18</sub>, by R<sub>25</sub> and R<sub>26</sub>, and by R<sub>27</sub> and R<sub>28</sub>. See formula (III) in claim 6 of JP '874 for the location of the R variables.

5. Claims 19 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Li et al. (US 6,723,445 B2).

Li et al. disclose various quinoxaline derivatives within the scope of a quinoxaline derivative represented by present formula 5, and teach that the quinoxaline derivatives may be used in the light-emitting layer of an electroluminescent device. For example, see column 4, line 37-c. 5, l. 14, and see the formulae at c. 6, l. 40-50, c. 7, l. 15-28, c. 10, l. 21-35 and c. 10, l. 52-65. The compound represented by the formula at c. 10, l. 52-65 is a specific example of a quinoxaline derivative represented by formula 5 wherein each of R<sub>1</sub> to R<sub>8</sub> represents hydrogen, and each of X and Y represents an unsubstituted heterocyclic group. This prior art compound further meets the limitations of the quinoxaline derivative required by present claim 28 wherein the quinoxaline derivative comprises a heterocyclic group represented by formula 6 wherein A represents S.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 16, 20, 22, 24, 26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 9-188874 as applied to claims 15 and 17-19 above, and for the further reasons set forth below.

Regarding claim 16, JP '874 does not disclose a specific example of a quinoxaline derivative represented by present formula 2, but suggests such a derivative in teaching that when a pair of R variables joins together to form a ring, there may be further condensed rings (e.g. see paragraph [0045]). A quinoxaline derivative represented by present formula 2 is a quinoxaline derivative represented by present formula 1, having a further condensed ring. JP '874 discloses quinoxaline derivatives represented by present formula 1, which are derivatives of formula (III) of JP '874 wherein R<sub>16</sub> and R<sub>17</sub> join to form a ring and R<sub>26</sub> and R<sub>27</sub> join to form a ring.

Regarding claims 20, 22, 24, 26 and 28, which further require the quinoxaline derivative to comprise a thienyl group (a heterocyclic group represented by formula 6 wherein A represents S) or a furanyl group (a heterocyclic group represented by formula 6 wherein A represents O), JP '874 teaches that the quinoxaline derivatives may comprise a heterocyclic radical such as a thienyl radical. For example, see paragraph [0044].

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make other compounds similar to the specific compounds disclosed by the prior art, and within the prior art guidelines, in order to provide a variety of compounds suitable for use in the prior art invention. One of ordinary skill in the art would have reasonably expected that compounds similar to III-57, III-160 and III-263, having an additional benzene ring condensed to the ring formed by R<sub>16</sub> and R<sub>17</sub>, and/or an additional benzene ring condensed to the

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ring formed by R<sub>26</sub> and R<sub>27</sub>, would have properties similar to the properties of III-57, III-160 and III-263, and could be used for the same purpose since the prior art teaches that the compounds may have further condensed rings. One of ordinary skill in the art also would have reasonably expected that compounds similar to III-56 through III-58, III-159 through III-161 and III-262 through III-264, having a heterocyclic radical such as a thienyl radical in place of -Ph for R<sub>13</sub>, would have properties similar to the properties of III-56 through III-58, III-159 through III-161 and III-262 through III-264, and could be used for the same purpose since the prior art teaches that R<sub>13</sub> may be a heterocyclic radical such as a thienyl radical.

8. Claims 21, 23, 25, 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 9-188874 as applied to claims 15 and 16 above, and further in view of Li et al. (US 6,723,445 B2).

JP '874 teaches that the quinoxaline derivative may be used in the light-emitting layer in combination with another luminescent material. For example, see paragraphs [0145] and [0147]. JP '874 does not teach using a phosphorescent material as the additional luminescent material.

Li et al. teach that a quinoxaline derivative may be used as a host material in a light-emitting layer of an electroluminescent device, and that the dopant may be a phosphorescence material. For example, see column 4, line 37-c. 5, l. 14 and c. 8, l. 25-37 of the Li patent.

It was known in the art at the time of the invention that device efficiency of an electroluminescent device can be improved by using a phosphorescent material instead of a fluorescent material.

It would have been an obvious modification to one of ordinary skill in the art at the time of the invention, having knowledge of Li's disclosure that quinoxaline derivatives can be used as host materials for phosphorescent materials in electroluminescent devices, and having general knowledge in the art that device efficiency can be improved by using a phosphorescent material instead of a fluorescent material, to utilize a phosphorescent material in place of a fluorescent material when making a device comprising a combination of luminescent material and quinoxaline derivative as taught, for example, in paragraph [0147] of JP '874.

9. Applicant is advised that should claim 23 be found allowable, claims 25, 27 and 29 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Perhaps claims 25, 27 and 29 should be amended to depend from claims 17, 18 and 19, respectively.

10. Miscellaneous:

In Fig. 5, the label for the x-axis should read "CURRENT" instead of --CURREENT--.

11. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.



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The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY  
December 03, 2005

A handwritten signature in cursive script that reads "Marie R. Yamnitzky".

**MARIE YAMNITZKY  
PRIMARY EXAMINER**

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